agri-fax Alberta AGRICULTURE

Agdex 622/6
Revised April 1989

Russian Wheat Aphid

Introduction

The Russian wheat aphid, *Diuraphis noxia*, occurs throughout the Great Plains, north to Alberta and Saskatchewan. Russian wheat aphids damage small grains by injecting toxic saliva into the leaves and by sucking sap from the leaves. Yield losses of 50 per cent or more have been attributed to Russian wheat aphids.

courtesy of Colorado State University

Description

The adult aphids are about 2 mm in length and yellow-green or grey-green in color. Their bodies are peculiarly spindle-shaped and can be distinguished from other aphids that occur in cereals by a projection above the last abdominal segment which gives the Russian wheat aphid a "forked tail" appearance when viewed from the side. Adults may be either winged or wingless. Immature aphids (nymphs) resemble the adults but are smaller.

The Western wheat aphid is similar in appearance to the Russian wheat aphid, but causes no visible damage to cereals.

Life Cycle

Only female Russian wheat aphids are found in North America. Adult female aphids give birth to live young and can produce two or three offspring per day. Under ideal conditions, aphid populations can increase by 35 fold in just 14 days.

Wheat, barley and triticale are most susceptible to aphid damage; rye and oats are tolerant of the aphid. Various grasses including wild oats, downy brome, quack grass and the wheat grasses serve as alternate hosts. Barnyard grass, canary grass, timothy and smooth brome will not harbor Russian wheat aphids nor will any non-grass species.

Injury

Russian wheat aphids may move into cereals from adjacent fields and headlands and cause damage that first appears on the edges of the cereal fields.

Alternatively, winged aphids may be carried in by the wind. Depending on wind conditions and wind direction, great numbers of aphids can be blown into Alberta from the United States and large areas can be infested in a short period of time. Wind-borne aphids will settle out over entire fields, establish aphid colonies and create a pattern of damage that first appears as "polka-dots" throughout the field. The aphid colonies increase, spread outwards and create dead spots in fields (see photos). Left unchecked, the entire field can be infested.

On older plants, small colonies of aphids cause leaves to discolor within 3-4 days. This discoloration appears as alternating white or yellow longitudinal streaks. Purple streaks appear during cool weather. The streaks may run almost the entire length of the leaf.

As infested leaves lose color, they may also roll together from the edges, form a tube and enclose the

Streaked leaves, plants that appear flattened and dead spots in fields are symptoms of Russian wheat aphid infestation. Courtesy of Kansas State University

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aphids. Aphids feed and reproduce within the rolled leaves and are protected to some degree from predators, parasites and contact insecticides.

Aphid clusters are found on the upper side of leaves near the base of the plant during the early stages of plant growth. Later, the aphids infest the flag leaf. Some of the emerging heads become trapped in the boot and appear white and bent like a "fish hook". These symptoms are similar to those of frost injury. The entire plant may be a purplish color. Heavily infested plants may appear flattened, with tillers lying almost parallel to the ground.

Rolled leaves may be more common than the streaked effect on seedlings. Dead spots from 1 to 6 metres in diameter may appear in fields where aphids were abundant early in the season.

Cultural Control

Do not seed spring cereals next to heavily infested winter wheat or fall rye.

Seed spring cereals as early as possible so that they mature before aphid populations increase.

Use oats as a nurse crop for grasses. Oats are more tolerant of aphid damage than barley and wheat.

Chemical Control

The economic threshold is the density of insects or the level of insect damage at which the cost of control becomes justifiable. The threshold for Russian wheat aphid is measured in terms of the percentage of plants showing damage. Economic thresholds for the application of insecticides have been adopted from aphid control recommendations in the United States.

The goal of insecticide treatment is to protect the flag leaf because of its major contribution to yield. Most damage is done in the time between the appearance of the flag leaf and the head.

Insecticides should be applied to **winter wheat** and **fall rye** as follows:

When	% of Plants Showing Damage
Border infestations in fall	50%
Whole field infestations in fall	15%
Up to boot stage in spring	10%
Dough to maturity	Do not apply insecticides

Apply insecticides to **spring wheat, barley** and **rye** as follows:

When	% of Plants Showing Damage
Seedling to flowering	10-20%
Flowering to dough	20%
Dough to maturity	Do not apply insecticides

Ground and aerial application of chlorpyrifos may be used as follows unless otherwise indicated on the label:

Insecticide	Rate ml/ac	Restrictions
Chlorpyrifos (Lorsban 4E)	400	- Do not harvest within 60 days of application. - Apply only once per season. - Follow label for safety precautions. - Not registered on rye.

Additionally, formulations of dimethoate under the trade names Chipman Sys-tem 480EC and Cygon 480 systemic insecticide, and formulations of malathion under the trade names Pfizer 50% Malathion and Sanex Malathion 50EC are registered for control of aphids in cereals. For 1989, these products can be used to control Russian wheat aphid. Check with your local dealer to determine availability, dosage, precautions, wait periods and other information on application.

Lorsban and dimethoate provide a high level of control, but Lorsban reduces the level of infestation to zero on a much higher percentage of plants than dimethoate. Therefore, dimethoate may only provide short term suppression of Russian wheat aphid. Malathion has not been effective for Russian wheat aphid control in the United States. Dimethoate is a systemic and may be used when curled leaves enclose the aphids. Chloropyrifos has both a contact and vapor action and it may also be used when leaves are curled.

Precaution: Always apply pesticides according to label directions. Do not swallow, inhale or allow insecticides to contact your skin. Wash thoroughly after use and wear protective clothing as directed on the label. Do not allow insecticides to drift to water bodies or onto other properties. In areas where bees are present, apply insecticides in the evening or early in the morning when bees are not foraging.

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